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## PROCEEDINGS.

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**Eight hundred and ninety-first Meeting.**

**May 12, 1897. — ANNUAL MEETING.**

The Academy met at the Jefferson Physical Laboratory of Harvard College, Cambridge.

The PRESIDENT in the chair.

The chair announced the death of Matthew Carey Lea, of Philadelphia, Associate Fellow.

The Corresponding Secretary read letters from Ludwig Boltzmann, Wilhelm Dörpfeld, and W. Pfeffer, acknowledging their election as Foreign Honorary Members; also a circular from the Academy of Natural Sciences of Philadelphia, calling attention to a proposed amendment to the regulations governing the mails of the Universal Postal Union.

The Corresponding Secretary read the Report of the Council.\*

The Treasurer presented his annual report, of which the following is an abstract:—

### GENERAL FUND.

#### *Receipts.*

Balance, May 1st, 1896	.. . . . .	.. . . . .	\$2,115.68
Assessments	.. . . . .	\$920.00	
Sale of publications	.. . . . .	<u>163.62</u>	\$1,083.62
Income from investments	.. . . . .		4,718.21
Return of bank tax	.. . . . .		41.18
Donations	.. . . . .	105.00	<u>5,948.01</u>
			\$8,063.69

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\* See Proceedings, Vol. XXXII. p. 331.

*Expenditures.*

General expenses . . . . .	\$2,027.75
Publishing expenses . . . . .	2,599.62
Library expenses . . . . .	1,475.09
Balance, May 1st, 1897 . . . . .	<u>\$6,101.96</u>
	1,961.73
	<u>\$8,063.69</u>

## RUMFORD FUND.

*Receipts.*

Balance, May 1st, 1896 . . . . .	\$1,908.33
Income . . . . .	\$2,576.41
Return of bank tax . . . . .	96.08
	<u>2,672.49</u>
	<u>\$4,580.82</u>

*Expenditures.*

Books and binding . . . . .	\$53.22
Publishing expenses . . . . .	883.94
Investigations . . . . .	500.00
Rent . . . . .	10.00
Balance, May 1st, 1897 . . . . .	<u>\$1,447.16</u>
	3,133.66
	<u>\$4,580.82</u>

## WARREN FUND.

*Receipts.*

Balance, May 1st, 1896 . . . . .	\$614.89
Income . . . . .	856.06
	<u>\$1,470.95</u>

*Expenditures.*

Investigations . . . . .	\$600.00
Balance, May 1st, 1897 . . . . .	870.95
	<u>\$1,470.95</u>

## BUILDING FUND.

*Receipts.*

Balance, May 1st, 1896 . . . . .	\$288.68
Income . . . . .	485.10
	<u>\$773.78</u>
Balance, May 1st, 1897 . . . . .	\$773.78

The Librarian presented his annual report, of which the following is an abstract: — 3,329 books and pamphlets have been added to the Library during the past year, 2,429 of which were obtained by gift and exchange, 687 purchased with the appropriation from the income of the General Fund, at a cost of \$334.98, and 213 with the appropriation from the income of the Rumford Fund, at a cost of \$23.92. During the year, 561 volumes were bound at an expense of \$620.10, of which \$26.80 was charged to the Rumford Fund. The total expenditure for books, periodicals, and binding amounted to \$979.00 of which \$50.72 was charged to the Rumford Fund. 180 books were borrowed from the Library by 31 persons, 20 of whom were Fellows of the Academy.

The following reports were also presented: —

#### REPORT OF THE RUMFORD COMMITTEE.

At a meeting, October 26, 1896, the Committee voted that the sum of \$400 be put at the disposal of Professor Henry Crew, of Northwestern University, for investigations on the electrical, chemical, and thermal effects of the electric arc.

The sum of \$100 was also voted to Mr. R. O. King, for investigations on the Thomson effect in metals.

JOHN TROWBRIDGE, *Chairman.*

May 12, 1897.

#### REPORT OF THE C. M. WARREN COMMITTEE.

In behalf of the C. M. Warren Committee I have to report that during the past year a grant of six hundred dollars (\$600) has been made to Professor C. F. Mabery, of Cleveland, Ohio, in aid of his investigations of the chemistry of petroleum; and a grant of two hundred dollars (\$200) to Professor H. O. Hofman, of Boston, in aid of his investigation of the formation-temperatures of certain silica-iron-lime slags of metallurgical importance.

I have received from Professor F. C. Phillips a highly satisfactory "report of progress" concerning his researches on natural gas, in behalf of which a grant was made by the Academy year before last.

Professor Mabery's researches on petroleum have gone on steadily during the year, and several important papers relating to them have been published by him.

F. H. STORER, *Chairman.*

## REPORT OF THE COMMITTEE OF PUBLICATION.

During the past year two numbers of Vol. XII. of the Memoirs have been published, aggregating 296 pages and 26 plates, as well as the whole of Vol. XXXI. and fourteen numbers of Vol. XXXII. of the Proceedings aggregating 674 pages and 1 plate.

One Memoir and eight papers in the Proceedings have been paid for from the Rumford Fund, and two papers appeared in Vol. XXXI. of the Proceedings, at no cost to the Academy. From the Academy's general funds there have been expended \$1,131.89 for Memoirs, and \$1,467.73 for Proceedings, a total of \$2599.62.

In May last the Academy appropriated from its general funds the sum of \$2,300 for publications; at the December meeting there was added to this the sum of \$461 (the direct subscription the previous year for the publication of Vol. XXXI. of the Proceedings), together with the proceeds from the sales of publications during the year, which have amounted to \$163.62, giving a total appropriation of \$2,924.62, and leaving an unexpended balance of \$325.

The Committee hopes that to the usual annual appropriation of \$1,800 this sum of \$325 may be added.

A change has been made in the mode of publication of the Proceedings which insures a more prompt issue without adding to their cost.

SAMUEL H. SCUDDER,  
*Chairman.*

On the recommendation of the Committee of Finance, it was  
*Voted*, To make the following appropriations from the income  
of the General Fund for the ensuing year:

For general expenses . . . . .	\$2,000.00
For the Library . . . . .	1,400,00
For publications . . . . .	2,100,00

*Voted*, That the assessment for the ensuing year be five dollars.

*Voted*, That one thousand dollars (\$1,000) from the income of the Rumford Fund be placed at the disposal of the Rumford Committee, to be expended in aid of investigations on Light and Heat, payments to be made on the order of the Chairman of the Committee.

On the recommendation of the C. M. Warren Committee it was

*Voted*, That the sum of six hundred dollars (\$600) from the income of the C. M. Warren Fund be granted to Professor C. F. Mabery of Cleveland, Ohio, to aid him in continuing his researches on the chemistry of petroleum.

The Chair announced that H. E. Scudder and Roland Thaxter had asked to have their nominations for the Council withdrawn.

The annual election resulted in the choice of the following officers and committees:—

ALEXANDER AGASSIZ, *President.*

JOHN TROWBRIDGE, *Vice-President for Class I.*

GEORGE L. GOODALE, *Vice-President for Class II.*

AUGUSTUS LOWELL, *Vice-President for Class III.*

SAMUEL H. SCUDDER, *Corresponding Secretary.*

WILLIAM WATSON, *Recording Secretary.*

ELIOT C. CLARKE, *Treasurer.*

HENRY W. HAYNES, *Librarian.*

*Councillors.*

HENRY MITCHELL,  
LEONARD P. KINNICUTT, } of Class I.  
EDWARD H. HALL,

HENRY P. BOWDITCH,  
WILLIAM M. DAVIS, } of Class II.  
BENJAMIN L. ROBINSON,

JOHN E. HUDSON,  
BARRETT WENDELL, } of Class III.  
EDWARD ROBINSON,

*Member of the Committee of Finance.*

AUGUSTUS LOWELL.

*Rumford Committee.*

ERASMUS D. LEAVITT, AMOS E. DOLBEAR,  
EDWARD C. PICKERING, ARTHUR G. WEBSTER,  
CHARLES R. CROSS, THEODORE W. RICHARDS,  
THOMAS C. MENDENHALL.

*C. M. Warren Committee.*

FRANCIS H. STORER,      HENRY W. HILL,  
CHARLES L. JACKSON,      LEONARD P. KINNICUTT,  
SAMUEL CABOT,      ARTHUR M. COMEY,  
ROBERT H. RICHARDS.

The following gentlemen were elected members of the Academy:—

Harry Manley Goodwin, of Boston, to be a Resident Fellow in Class I., Section 2 (Physics).

Frank Arthur Laws, of Boston, to be a Resident Fellow in Class I., Section 2.

Walter Lewis Jennings, of Worcester, to be a Resident Fellow in Class I., Section 3 (Chemistry).

Abbott Lawrence Lowell, of Boston, to be a Resident Fellow in Class III., Section 3 (Political Economy and History).

William Osler, of Baltimore, to be an Associate Fellow in Class II., Section 4 (Medicine and Surgery), in place of the late Henry Newell Martin.

William Henry Welch, of Baltimore, to be an Associate Fellow in Class II., Section 4.

Horace Howard Furness, of Philadelphia, to be an Associate Fellow in Class III., Section 4 (Literature and the Fine Arts).

Edmund Clarence Stedman, of New York, to be an Associate Fellow in Class III., Section 4.

Percival Lowell gave an account of some “ New Observations of the Planet Mercury.”

The following papers were presented by title:—

On the Locus that represents an Automorphic Linear Transformation of a Bilinear Form. By William E. Story and Henry Taber.

Studies on the Central and Peripheral Nervous Systems of two Polychæte Annelids. By Margaret Lewis. Presented by E. L. Mark.

On the Temperature Coefficient of the Potential of the Calomel Electrode, with several different Supernatant Electrolytes. By T. W. Richards.

Note on the Rate of Dehydration of Crystallized Salts. By T. W. Richards.

On the 3, 4, 5 Tribromaniline and some Derivatives of unsymmetrical Tribrombenzol. By C. Loring Jackson and F. B. Gallivan.

On the Oxide of Dichlormethoxyquinonedibenzoylmethylacet-al. By C. Loring Jackson and H. A. Torrey.

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**Eight hundred and ninety-second Meeting.**

June 9, 1897.

The Academy met at the house of Francis Blake, at Weston. The **PRESIDENT** in the chair.

The Chair announced the death of Alvan Graham Clark, Benjamin Eddy Cotting, and John Lowell, Resident Fellows.

The Chair read a letter from the Boston Society of Natural History in reference to inviting the American Association for the Advancement of Science to meet in Boston in 1898. This matter was referred to the executive officers.

The following papers were read : —

Certain Considerations concerning the Coinage of the Colony and the Public Bills of Credit of the Province of the Massachusetts Bay. By A. McFarland Davis.

Suggestions for the Development of the Arts and Sciences. By William R. Livermore.

The following papers were presented by title : —

The Orthopteran Group Scudderiae. By S. H. Scudder.

Contributions from the Gray Herbarium of Harvard University. New Series. No. XII. — By M. L. Fernald. I. A Systematic Study of the United States and Mexican Species of *Pectis*. II. Some rare and undescribed Plants collected by Dr. Edward Palmer at Acapulco, Mexico. Presented by B. L. Robinson.

A Revision of the Atomic Weight of Cobalt. By T. W. Richards and G. P. Baxter.

A Revision of the Atomic Weight of Nickel. By T. W. Richards and A. S. Cushman.

**Eight hundred and ninety-third Meeting.**

October 13, 1897. — STATED MEETING.

VICE-PRESIDENT TROWBRIDGE in the chair.

The Chair announced the death of Theodore Lyman, Resident Fellow; Alfred Marshall Mayer, James Hammond Trumbull, Associate Fellows; Alfred Louis Olivier Legrand Des Cloizeaux, Victor Meyer, Julius von Sachs, and Johannes Japetus Smith Steenstrup, Foreign Honorary Members.

The Corresponding Secretary read a letter from Henry M. Howe, resigning his fellowship on account of removal to New York.

The following gentlemen were elected members of the Academy:—

James Mills Peirce, of Cambridge, as Resident Fellow in Class I., Section 1 (Mathematics and Astronomy).

Ira Nelson Hollis, of Cambridge, as Resident Fellow in Class I., Section 4 (Technology and Engineering).

Heinrich Brunner, of Berlin, as Foreign Honorary Member in Class III., Section 1 (Philosophy and Jurisprudence).

Frederic William Maitland, of Cambridge, as Foreign Honorary Member in Class III., Section 1.

Georg Morris Cohen Brandes, of Copenhagen, as Foreign Honorary Member in Class III., Section 4 (Literature and the Fine Arts).

Pierre Cécile Puvis de Chavannes, of Paris, as Foreign Honorary Member in Class III., Section 4.

Amos E. Dolbear read a paper entitled "Contrasted Properties of Matter and the Ether." Remarks on this communication were made by W. E. Story and A. G. Webster.

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**Eight hundred and ninety-fourth Meeting.**

November 10, 1897.

In the absence of the regular presiding officers, MORILL WYMAN was chosen President *pro tempore*.

The following letters were received:— from H. M. Goodwin, Ira N. Hollis, and Frank Arthur Laws, accepting Fellowship; from C. H. Fernald, declining Fellowship; from Horace Howard Furness, Edmund C. Stedman, and William H. Welch, acknowledging election as Associate Fellows; also letters announcing the death of Johannes Japetus Smith Steenstrup and Julius von Sachs, Foreign Honorary Members, of Alfred Ritter von Arneth, President of the Imperial Academy of Sciences, Vienna, and of Tommaso Vallauri, Member of the Royal Academy of Sciences, Turin.

On the motion of Eliot C. Clarke, the following resolution was adopted:—

*Whereas*, The Academy has received from the executors of the estate of John Lowell the sum of three thousand dollars, being a bequest, unrestricted as to its disposition, therefore be it

*Resolved*, That the Academy accepts said bequest with grateful appreciation of the generosity and trust of its late honored Resident Fellow, and will apply the same to the general purposes of the Academy, and that the Corresponding Secretary notify this action to Judge Lowell's executors.

Theodore Wm. Richards presented a paper on the Atomic Weights. Remarks on this subject were made by Arthur G. Webster.

The following paper was presented by title:—

On the Cuprosammonium Bromides and the Cuprammonium Sulphocyanates. By Theodore Wm. Richards and Benj. S. Merigold.

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**Eight hundred and ninety-fifth Meeting.**

December 8, 1897.

The CORRESPONDING SECRETARY in the chair.

The Chair announced the death of Justin Winsor, Resident Fellow.

Letters were read from J. M. Peirce and F. W. Maitland, acknowledging election into the Academy; and from the Colonial

Society of Massachusetts, thanking the Academy for past courtesies, and requesting the use of its hall for the five stated meetings of the Society during the ensuing year.

On the motion of the Recording Secretary it was

*Voted*, To grant the request of the Colonial Society.

On the motion of the Treasurer, it was

*Voted*, That a Committee consisting of Messrs. Trowbridge, H. P. Bowditch, and Livermore be appointed on the part of the Academy to confer with any similar committee appointed on the part of the Massachusetts Historical Society, to ascertain whether the Academy can obtain suitable quarters in the new building of the Historical Society, and upon what terms, and to make any recommendation to the Academy which may seem desirable to said committee.

The following papers were read: —

On a recently discovered Egyptian Inscription relating to Israel. By Crawford H. Toy.

On some Properties of Fourfold Space. By William E. Story.

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**Eight hundred and ninety-sixth Meeting.**

January 12, 1898. — STATED MEETING.

VICE-PRESIDENT TROWBRIDGE in the Chair.

The Chair announced the death of Francesco Brioschi, of Milan, and Don Pascual de Gayangos, of Madrid, Foreign Honorary Members.

The Corresponding Secretary read letters from the Superior Technical Institute of Milan, and the Royal Academy of Lincei of Rome, announcing the death of Francesco Brioschi, Foreign Honorary Member; and from P. Puvis de Chavannes, acknowledging his election as Foreign Honorary Member.

On the motion of the Corresponding Secretary it was

*Voted*, To meet on adjournment on the second Wednesday in February.

On the recommendation of the Rumford Committee, it was

*Voted*, To appropriate the sum of four hundred dollars (\$400)

from the income of the Rumford Fund to W. C. Sabine for investigations in ultra-violet radiation.

On motion of Augustus Lowell it was

*Voted*, To authorize the Treasurer to make suitable arrangements with the Massachusetts Historical Society, for the accommodation of the Academy in the new building of the Society. It was also

*Voted*, To grant the free use of the hall of the Academy to the Historical Society for its regular meetings until the completion of the new building.

The following gentlemen were elected members of the Academy:—

George Edward Davenport, of Medford, to be a Resident Fellow in Class II., Section 2 (Botany).

John George Jack, of Boston, to be a Resident Fellow in Class II., Section 2.

John Merle Coulter, of Chicago, to be an Associate Fellow in Class II., Section 2, in place of the late Daniel Cady Eaton.

Douglas Houghton Campbell, of Palo Alto, to be an Associate Fellow in Class II., Section 2.

Elias Metschnikoff, of Paris, to be a Foreign Honorary Member in Class II., Section 3 (Zoölogy and Physiology).

The following papers were presented by title:—

The Thoracic Derivation of the Cardinal Veins in Swine. By G. H. Parker and C. H. Tozier.

The Analysis of the Action of the Vagus Nerve upon the Heart. Preliminary Notice. By L. J. J. Muskens. Presented by H. P. Bowditch.

On the Colored Compounds obtained from Sodic Alcoholates and Picrylchloride. By C. Loring Jackson and W. F. Boos.

The following papers were read:—

Changes in the Proportionate Diameters of the Shells of New England Mollusks. By Edward S. Morse.

A Probable Magnetic Telegraph of the Sixteenth Century. By Samuel Cabot.

On the Source of the X-Rays. By John Trowbridge.

**Eight hundred and ninety-seventh Meeting.**

February 9, 1898. — ADJOURNED STATED MEETING.

The Academy met at the house of John C. Ropes.

The RECORDING SECRETARY in the chair.

The following papers were read: —

The most recent Babylonian Explorations. By David G. Lyon.

The Seven Days' Battles near Richmond. By John C. Ropes.

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**Eight hundred and ninety-eighth Meeting.**

March 9, 1898. — STATED MEETING.

The PRESIDENT in the chair.

The Corresponding Secretary read letters from George Edward Davenport, Douglas H. Campbell, John M. Coulter, and El. Metschnikoff, acknowledging election into the Academy; and from F. W. Taussig, resigning his Fellowship.

The chair announced the death of Alonzo Smith Kimball, Resident Fellow; William Augustus Rogers, Associate Fellow; and Rudolf Leuckart, Foreign Honorary Member.

The following gentlemen were elected members of the Academy: —

Charles Rockwell Lanman, of Cambridge, to be a Resident Fellow in Class III., Section 2 (Philology and Archæology).

Albert Heim, of Zurich, to be a Foreign Honorary Member in Class II., Section 1 (Geology, Mineralogy, and Physics of the Globe).

Friedrich von Recklinghausen, of Strassburg, to be a Foreign Honorary Member in Class II., Section 4 (Medicine and Surgery).

Ferdinand Brunetière, of Paris, to be a Foreign Honorary Member in Class III., Section 4 (Literature and the Fine Arts).

The President appointed the following Councillors to act as Nominating Committee: —

Leonard P. Kinnicutt, of Class I., William M. Davis, of Class II., and John E. Hudson, of Class III.

On the recommendation of the Rumford Committee, it was

*Voted*, To appropriate from the income of the Rumford Fund the sum of two hundred and fifty dollars (\$250) to Professor A. A. Michelson, of Chicago, for an investigation regarding diffraction gratings. This is in addition to a sum of two hundred and fifty dollars already appropriated by the Rumford Committee from the funds at its own disposal.

The following papers were presented by title:—

Contributions from the Gray Herbarium of Harvard University. New Series. No. XIII.—By B. L. Robinson. I. Revision of the North American and Mexican Species of Mimosa. II. Revision of the North American Species of *Neptunia*.

An Inquiry into the Nature of Electrical Discharges in Air and Gases. By John Trowbridge.

On the Sources of Luminosity in the Electric Arc. By Henry Crew and Olin H. Basquin. Presented by C. R. Cross.

A Table of Atomic Weights. By Theodore William Richards.

On the Cause of the Retention and Release of Gases occluded by the Oxides of Metals. By Theodore William Richards.

Edward Atkinson read a paper, entitled "The Basis of the Science of Political Economy."

The question of printing a table of atomic weights every year, with T. W. Richards's corrections, was referred to the Committee of Publication.

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**Eight hundred and ninety-ninth Meeting.**

April 13, 1898.

The Academy met at the house of Augustus Lowell.

The **PRESIDENT** in the chair.

The President announced the death of Sir Henry Bessemer, Foreign Honorary Member.

The following papers were read:—

The Theory of Coral Reefs. By Alexander Agassiz.

Occurrence of Native Copper at Franklin Furnace, New Jersey. By John E. Wolff.

Exhibition and Preliminary Account of a Collection of Micro-photographs of Snow Crystals, made by W. A. Bentley. By John E. Wolff.

Albert A. Michelson exhibited and described a new form of spectroscope.

The following papers were read by title:—

Contributions from the Zoölogical Laboratory of the Museum of Comparative Zoölogy: A Contribution to the Study of Individual Variation in the Wings of Lepidoptera. By W. L. W. Field. Certain Sense Organs of the Proboscis of *Rhynchosbolus dibranchiatus*. By A. Oppenheimer. Presented by E. L. Mark.

Contributions from the Gray Herbarium of Harvard University. New Series. No. XIV.—By J. M. Greenman. I. Revision of the Mexican and Central American Species of *Galium* and *Relbunium*. II. Diagnoses of New and Critical Mexican Phanerogams. Presented by B. L. Robinson.

An Absolute Measurement of the Thomson Effect in Copper. By R. O. King. Presented by E. H. Hall.

Note on Stokes's Theorem in Curvilinear Co-ordinates. By A. G. Webster.

Note on the Projective Group. By E. W. Rettger. Presented by Henry Taber.

On the Thermal Conductivities of Certain Poor Conductors. By B. O. Peirce and R. W. Willson.